MONTHLY JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

MGA
BULLETIN

SEPTEMBER, 1953 · NUMBER 45

CONTENTS

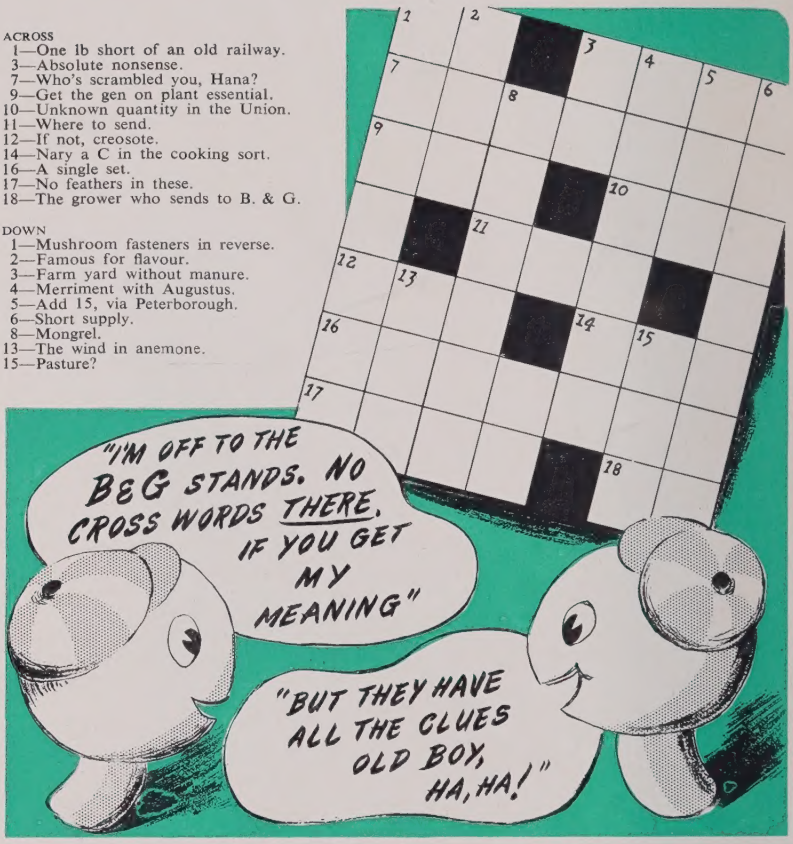
	Page
Editorial : You'll be there, of course !	287
Our Secretary	288
My Favourite Recipes—6 : Mrs. Winston Alderton	288
How to Steam Sterilize Your Casing Soil : L. G. Morris ...	289
The Air : Bed Ratio with Trays : M. C. Luxmoore	291
MUSHROOM PEST CONTROL : P. G. Fenemore	292
French Exports to U.S.A. : Ed. Walzer	294
Laboratory Examination of Samples : Miss D. G. Gandy & P. B. Flegg	295
Research Fund	298
My Way of Growing—12 : John Berry	299
News for Australia ?	301
Vermiculite	301
Mr. Henry Knaust in England : F. C. Atkins	302
Memo. for Middlebrook	303
New (July) Members	303
Thermometer Readings : T. T. Leach	303
Stanley Middlebrook's Diary	305

5/-

COMMONWEALTH MYCOLOGICAL INSTITUTE
3 SEP 1953

ACROSS
1—One lb short of an old railway.
3—Absolute nonsense.
7—Who's scrambled you, Hana?
9—Get the gen on plant essential.
10—Unknown quantity in the Union.
11—Where to send.
12—If not, creosote.
14—Nary a C in the cooking sort.
16—A single set.
17—No feathers in these.
18—The grower who sends to B. & G.

DOWN
1—Mushroom fasteners in reverse.
2—Famous for flavour.
3—Farm yard without manure.
4—Merriment with Augustus.
5—Add 15, via Peterborough.
6—Short supply.
8—Mongrel.
13—The wind in anemone.
15—Pasture?



All the Best mushrooms
go to the LARGEST DISTRIBUTORS
IN THE UNITED KINGDOM —

BROOME & GREEN (London) LTD.
COVENT GARDEN MARKET, LONDON

BROOME & GREEN (Glasgow) LTD.
CANDLERIGGS MARKET, GLASGOW

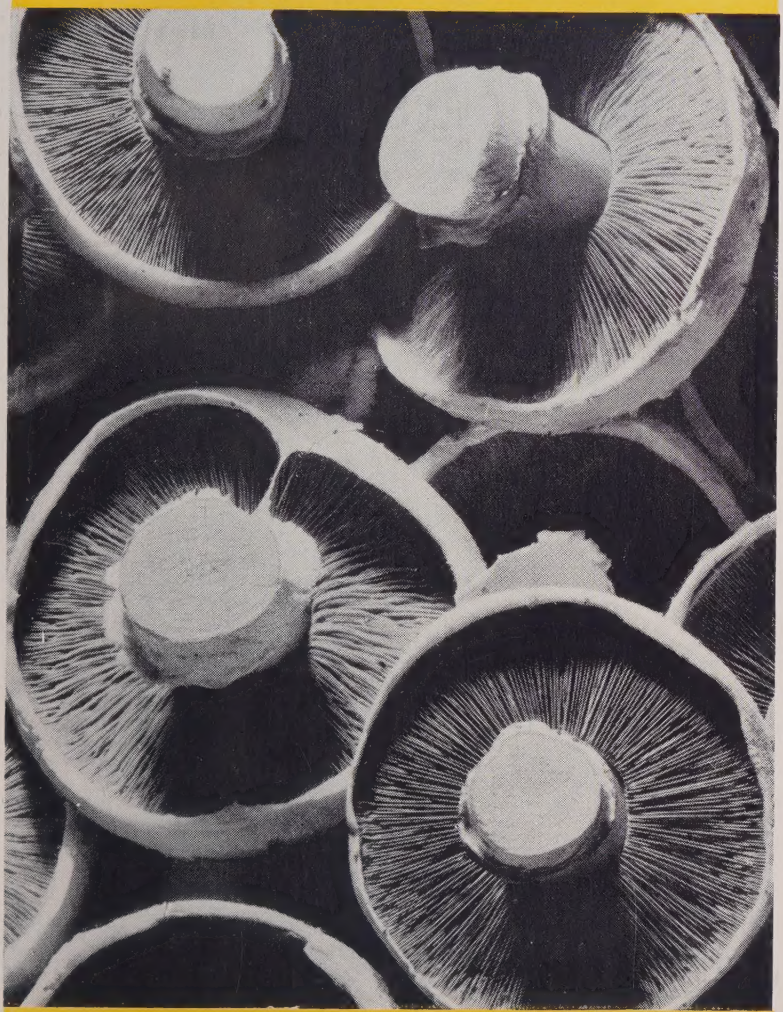
SOMERS & GIBSON LTD.
MANCHESTER & BLACKBURN

REGISTERED B&G TRADE MARK

YOU can be Sure of

Mount

Mushroom Spawn



Distributors: J. E. R. SIMONS LTD., HARLOW, Essex

TELEPHONE: POTTER STREET 65

M.R.A. Activators 99·9 Soluble Blood

They will "Spring up like mushrooms"—just as good mushrooms should, if you make your compost with Official M.R.A. Activators containing Abundance blood products which are nature's finest food for mushrooms. All Abundance blood products are certified sterilized and *FREE FROM DISEASE*.

ABUNDANCE PRODUCTS

1. 99·9 Soluble Blood.
2. Abundance Dried Blood.
3. Official M.R.A. Activators.

write for details and prices :

Dept. 2, BRADFORD FERTILIZER CO. LTD.
Whitefield Place, Girlington, Bradford, Yorks.

Typical Retailers WE serve with YOUR produce

GEORGE DUNHILL *

the owner of a large open-front shop on a busy main road.

"My customers are mostly factory workers", says Mr. Dunhill, "and believe me they are keen judges of quality and value.
In my type of business with quick sales and a big cash turnover, good weights are important to me as I work on a small margin. Good quality and good weight is what I look for. He's always very reliable . . . that's what they say about me. Well, I've dealt with Francis Nicholls Limited for many years now and I always find *them* reliable too"

*The name, of course, does not refer to any specific person.

RETAIL BUYERS WHO TAKE A PRIDE IN THE GOODS THEY OFFER TO THE PUBLIC WILL ALWAYS GIVE PREFERENCE TO THE PRODUCER WHO TAKES A PRIDE IN THE QUALITY, GRADING AND PACKING OF HIS PRODUCE

FRANCIS NICHOLLS LIMITED

THE LINK
BETWEEN CROP & CONSUMER

SMITHFIELD MARKET · BIRMINGHAM

To **ALL MUSHROOM GROWERS**

HORSE MANURE

v.

SYNTHETICS

Why think of Synthetics when we can supply every Mushroom Grower in England with every ton of Horse Manure he requires all the year round

★ When any Grower can buy Synthetics at a low price there will be no profit left in Mushroom Growing

REMEMBER! DIAMONDS ARE A HIGH PRICE BECAUSE THEY ARE RARE

★ Buy from the only organised firm of its kind in the country

D. C. BUSHELL & CO. (EASTERN) LTD.

Sandhurst Corn & Grist Mills, Camberley, Surrey

Telephone: YATELEY 2241

The modern wood preservative in improved form

This material, which has already gained wide acceptance by reason of high efficiency, economy and absence of fume hazards, now incorporates specific new surface active agents, which facilitate IMMEDIATE WETTING AND PENETRATION OF EVEN THE ROUGHEST TIMBER.

This has been achieved at the modest increase of only 10/- per 40 gallon drum, the prices of smaller sizes remaining unchanged.

Even more than before, HORTICEL is the obvious choice wherever wood is used in the Growing Industry.

PRICES

5 gallon drums	..	£2 4 0
10 gallon drums	..	£3 15 0
40 gallon drums	..	£12 10 0

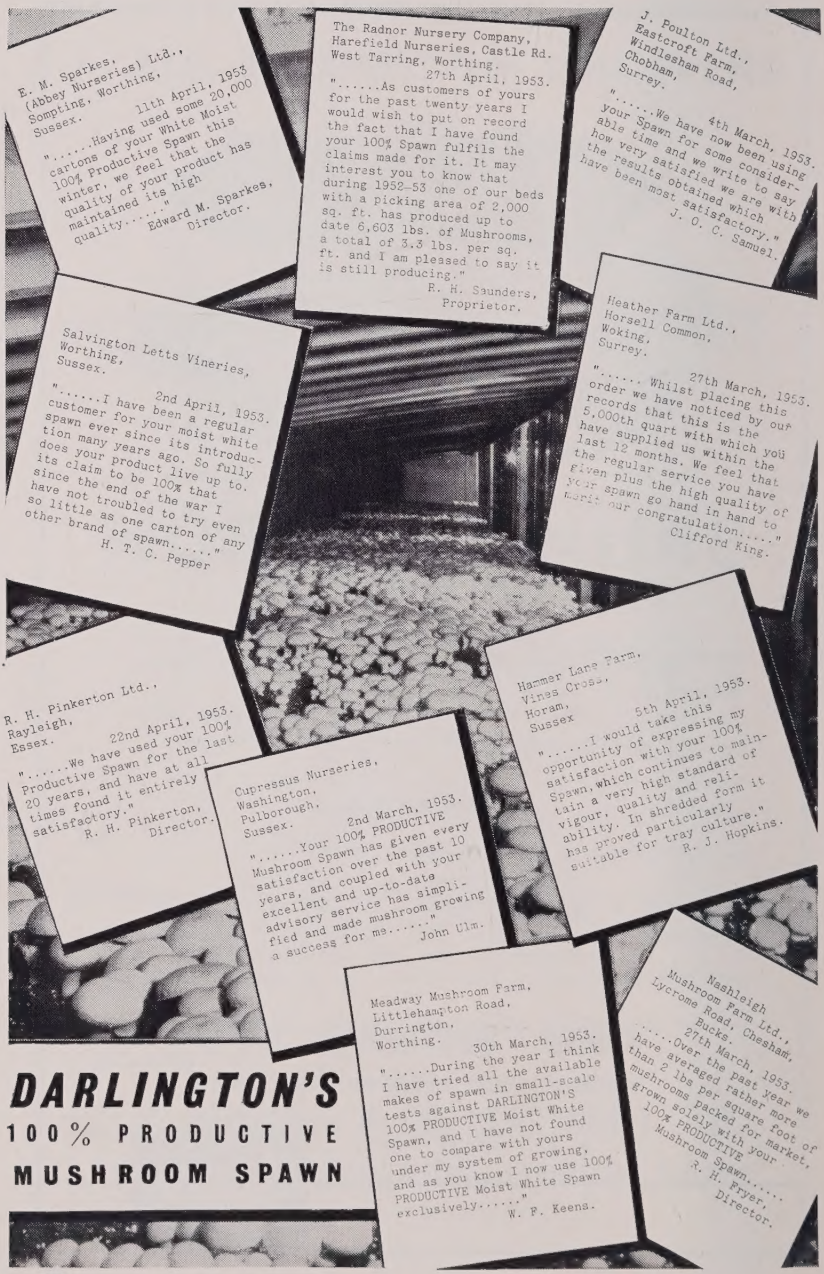
All containers free and non-returnable

GEO. MONRO LTD.

Hertford Road, Waltham Cross, Herts.

or your nearest depot

Monro
OF COVENT GARDEN


E. M. Sparkes,
(Abbey Nurseries) Ltd.,
Sompting, Worthing,
Sussex. 11th April, 1953
".....Having used some 20,000 cartons of your White Moist 100% Productive Spawn this winter, we feel that the quality of your product has maintained its high quality...."
Edward M. Sparkes,
Director.
The Radnor Nursery Company,
Harefield Nurseries, Castle Rd.
West Tarring, Worthing.
27th April, 1953.
".....As customers of yours for the past twenty years I would wish to put on record the fact that I have found your 100% Spawn fulfils the claims made for it. It may interest you to know that during 1952-53 one of our beds with a picking area of 2,000 sq. ft. has produced up to date 6,603 lbs. of Mushrooms, a total of 3.3 lbs. per sq. ft. and I am pleased to say it is still producing."
R. H. Saunders,
Proprietor.
J. Poulton Ltd.,
Eastcroft Farm,
Windlesham Road,
Chobham,
Surrey.
".....We have now been using your Spawn for some considerable time and we write to say how very satisfied we are with the results obtained which have been most satisfactory."
4th March, 1953.
J. O. C. Samuel.
Salvington Letts Vineries,
Worthing,
Sussex.
2nd April, 1953.
".....I have been a regular customer for your moist white spawn ever since its introduction many years ago. So fully does your product live up to its claim to be 100% that since the end of the war I have not troubled to try even so little as one carton of any other brand of spawn....."
H. T. C. Pepper
Heather Farm Ltd.,
Horsell Common,
Woking,
Surrey.
27th March, 1953.
".....Whilst placing this order we have noticed by our records that this is the 5,000th quart with which you have supplied us within the last 12 months. We feel that the regular service you have given plus the high quality of your spawn go hand in hand to merit our congratulation....."
Clifford King.
R. H. Pinkerton Ltd.,
Rayleigh,
Essex.
22nd April, 1953.
".....We have used your 100% Productive Spawn for the last 20 years, and have at all times found it entirely satisfactory."
R. H. Pinkerton,
Director.
Cupressus Nurseries,
Washington,
Pulborough,
Sussex.
2nd March, 1953.
".....Your 100% PRODUCTIVE Mushroom Spawn has given every satisfaction over the past 10 years, and coupled with your excellent and up-to-date advisory service has simplified and made mushroom growing a success for me....."
John Ulm.
Hammer Lane Farm,
Vines Cross,
Horam,
Sussex
5th April, 1953.
".....I would take this opportunity of expressing my satisfaction with your 100% Spawn, which continues to maintain a very high standard of vigour, quality and reliability. In shredded form it has proved particularly suitable for tray culture."
R. J. Hopkins.
Meadway Mushroom Farm,
Littlehampton Road,
Durrington,
Worthing.
30th March, 1953.
".....During the year I think I have tried all the available makes of spawn in small-scale tests against DARLINGTON'S 100% PRODUCTIVE Moist White Spawn, and I have not found one to compare with yours under my system of growing, and as you know I now use 100% PRODUCTIVE Moist White Spawn exclusively....."
W. F. Keens.
Nashleigh
Mushroom Farm Ltd.,
Lycrome Road, Chesham,
Bucks.
27th March, 1953.
".....Over the past year we have averaged rather more than 2 lbs per square foot of mushrooms packed for market, grown solely with your 100% PRODUCTIVE Mushroom Spawn....."
R. H. Fryer.
Director.
DARLINGTON'S
100% PRODUCTIVE
MUSHROOM SPAWN

The
MGA BULLETIN

SEPTEMBER 1953
NUMBER 45

EDITORIAL

You'll be there, of course!

Just four weeks ahead lies Harrogate, with all that famous name will recall for us in the years to come. We shall, I feel sure, look back on it as one of the most enjoyable of our many pleasant functions.

It is to be a two-day affair. We were to have had a short Refresher Course, but decided it would be overloading the programme. Now we shall start off with drinks in the lounge of the Hotel Majestic at 11 o'clock on Tuesday morning, 29th September. Mushroom growers always talk when they meet, but the hum of conversation seems to reach its highest peak at these annual Receptions. This is the social event of the year; do bring your wives, even if it does mean another new hat—or worse. **Dress at all functions will be quite informal.**

The Annual Mushroom Lunch will be followed by the Annual General Meeting. It is particularly important that you should be there this year. Our Chairman, Mr. Harold Boxall, will be referring to several matters which have a significant bearing on the future policy of the MGA.

Our new Secretary, Mr. Percy Anderson, has had two unfortunate spells in hospital and we must face up to the fact that in his absence the office is closed and work comes to a standstill. *We must give him clerical assistance.* Can we afford it? Rather, can we afford not to afford it?

There is another equally important matter we must discuss. Hitherto, members have been able to rely on the MGA for independent advice on any question remotely connected with our business. Mr. Anderson is admirably qualified as an administrative secretary and accountant; but as yet he knows nothing whatever about the complicated technique of growing mushrooms. *How, then, can we expect him to advise us,* who meet these problems every day of our lives?

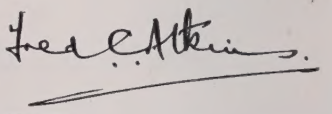
> **We are faced with a dilemma: Obviously we cannot increase subscriptions (to provide secretarial assistance) while at the same time reducing the service (if we cease to reply to cultural questions).**

These and other aspects which are causing the Executive Committee anxiety will be explained more fully by Mr. Boxall on 29th September. They affect you personally, and your participation in the subsequent discussion would be of material advantage to all of us.

We shall be ready to relax in the evening when the Mayor of Harrogate is honouring us with a Civic Reception, complete with refreshments and light music.

The next day will show us the Mushroom Industry Exhibition in the Royal Hall. The centre piece will be the mushrooms competing for the several Challenge Cups; and we hope for a strong entry from all

over the country. There will be several new exhibitors in the Trade section, one of them dealing with Publicity for mushrooms—a subject too long neglected. Are we to continue to ignore it? Come and see some novel and exciting ideas individual growers have put into practice, or would like to see adopted.



OUR SECRETARY: *All members will learn with regret of the serious illness of Mr. Percy Anderson, and, we trust, bear with the consequent delays in correspondence and other matters.*

My Favourite Recipes

6.—Mrs. Winston Alderton

I think that mushrooms added to many ordinary dishes give that extra " something " that makes them so much more tasty. The following recipes are very popular with my family:

Mushroom Flan

Line a shallow sponge-cake tin with short crust pastry. Cook and leave to cool, then add the following filling:—

1 tin chicken soup
2 or 3 rashers bacon
¼ lb. mushrooms

Chop bacon into small pieces and fry with mushrooms in a little fat. Thicken soup with 1 dessertspoonful cornflour, adding salt and pepper to taste. Mix together with fried bacon and mushrooms, and fill pastry case. Reheat in oven.

(*Taken from a Woman's Magazine.*)

Mushroom and Potato Scallop

1 lb. mushrooms
½ lb. potatoes
½ lb. onions

Grease a large pyrex dish with margarine. Fill with alternate layers of onions, mushrooms, and potatoes, sprinkling each layer of mushrooms with salt, pepper and a little flour, finishing with a layer of potatoes. Put 5 teaspoons margarine on top and half fill dish with milk. Bake in a moderate oven for 1 hour (or until the potatoes are soft).

(*Given me by a Canadian girl.*)

Scrambled Eggs and Mushrooms

Melt 2 oz. butter in a saucepan and simmer in it ¼ lb. mushrooms cut into small pieces. Cook ¼ hour, add salt and pepper to taste, add 2 beaten eggs and stir until eggs are cooked. Serve on hot buttered toast.

(*Taken from Complete Home Cookery Household Reference Library.*)

How to Steam Sterilise Your Casing Soil

By **L. G. MORRIS, B.Sc. (Eng.), A.F.R.Ae.S.**

I propose in this short article to start with the fundamental principles underlying steam sterilising because if you understand them you will be able to vary your method to suit your own conditions without running into trouble.

General Principles

1. Steam heats the soil to the boiling point of water (212° F.), no more and no less. It heats by condensing on the first cold particles of soil it reaches; the result is that the soil is heated progressively, the part near the steam pipe first and the surface last. The job is complete when the surface soil has reached 212° F. and if the steam were to be turned off before this the lower soil would be at 212° F. and the upper part would still be cold. In between would be a thin layer which was receiving heat at the time the steam was turned off. We must therefore heat all the soil to boiling point; it is not possible to stop the process at any lower temperature however desirable it may be.

2. The steam pressure in the boiler may be anything between 5 p.s.i. and 100 p.s.i. The pressure in the soil itself cannot exceed $\frac{1}{2}$ p.s.i. and the remainder of the pressure is used in delivering the steam from the boiler to the soil. High pressure may be useful if the steam has to be taken through a main hundreds of feet long although low pressure steam may also be piped over long distances if the main is the right size. However, long mains should be avoided if possible and normally most of the boiler pressure should be used in forcing the steam through small holes into the soil.

3. Soil cannot condense steam faster than a certain rate and if the steam is supplied too fast it will blow through the soil and be wasted. The rate of condensation varies with soil conditions but 30 lb. of steam per hour for each sq. ft. of soil surface should be safe for most soils. Remember that the steam should condense in the soil, not in the air, and no steam should be seen until the cook is almost completed.

4. The soil should be free from large lumps and as dry as possible. Soil which is too moist is difficult to sterilise uniformly and may become waterlogged. Apart from this, water takes five times as much heat as the same weight of dry soil and there is no point in heating more moisture than you have to.

These are the fundamental points to be remembered. Methods of sterilising can vary widely, but provided these principles are observed any method can be made to work.

I will now deal briefly with the sort of equipment which is likely to be of use to the mushroom grower.

Boilers

The first thing to decide is the size of boiler required. This is measured in lb. of steam produced per hour (10 lb. steam = 1 gall. water evaporated = 10,000 B.T.U. of heat).

The boiler capacity depends on the amount of soil to be sterilised per hour and if this quantity is known, the boiler capacity can easily be fixed by allowing 150 to 200 lb. of steam per ton of soil. The range of size likely to be useful is from about 150 to 800 lb./hour.

Several types of boiler can be used. The vertical cross tube boiler is an obvious choice, possibly a high pressure boiler which has seen better days but which the Insurance Inspector is prepared to pass for low pressure use. Another possibility which should be mentioned is to use a sectional hot water boiler. Many of these can be fitted with a steam drum for generation of low pressure steam and when not used for steam they may be used for hot water heating.

Soil containers

In order to use both the boiler and labour continuously it is a good plan to have two soil containers so that one can be emptied and refilled while the other is steamed. The depth of soil should be between 9″ and 18″ and the steam should be injected at the bottom through holes no farther apart than the depth of soil.

The time taken to heat the soil if steam is supplied at the correct rate will be roughly one minute per inch of depth or a little less. Steam should be passed until the surface soil reaches boiling point and the soil should be left covered for a further few minutes with steam off.

A good method which should by now be well-known is that developed by Mr. Lawrence at the John Innes Horticultural Institution. Two brick built bins of 1 cubic yard capacity and 1 foot in depth are used with steam pipes sunk into the concrete floor. The steam issues into the soil through $\frac{1}{8}$″ holes at 9″ spacing each way. These bins should handle about 4 tons of soil per hour and consume about 800 lb. of steam per hour.

An alternative method which minimises the labour in handling the soil is to use two trolleys of the type illustrated. This one was made at N.I.A.E. and is not in production, but a similar sort of thing should be easy to get made. These may be filled with soil, wheeled to the boiler for steaming and then emptied by tipping where the steamed soil is to be stored, so that the soil is only shovelled once. The capacity is 4 cwts. and with two trolleys $\frac{3}{4}$ ton of soil may be steamed per hour consuming about 150 lb. of steam per hour.

Photograph by courtesy of National Institute of Agricultural Engineering

Putting the steam into the soil

Whether your steam is used efficiently or not depends mainly on how fast the steam is injected. This rate of flow is governed by the total area of the holes in the steam pipes and the steam pressure available. Provided the spacing of the holes is uniform and less than the depth of soil the exact size and number of holes is not important; it

is the total area that counts. If the area is doubled, the rate of steam flow is doubled also. The most practical hole size ranges from $\frac{1}{16}$" diameter for high pressure steam to $\frac{1}{8}$" diameter for low pressure. It is as well to remember that the holes increase in size as time goes by and there may come a time when you must weld them up and drill new ones.

The relationship between pressure and steam flow is that the flow is proportional to the square root of the gauge pressure. For example, a fourfold increase in pressure will double the steam supply.

The steam flow through any combination of hole area and steam pressure can be worked out from these relationships and the fact that 100 lb. of steam per hour is passed by 12, $\frac{1}{8}$" holes at 5 p.s.i. pressure or by 12, $\frac{1}{16}$" holes at 80 p.s.i.

The cross sectional area of each perforated pipe should be at least as great as the total area of its holes, or uneven steam distribution may result.

The steam main connecting the boiler to the perforated pipes should be of adequate size. The size should be larger for low pressure steam than for high pressure but a small increase in diameter permits a large increase in steam flow. Most mains will be within the range $1\frac{1}{4}$" to 2" diameter.

If trouble is experienced due to wetness in the steam a trap should be fitted at the downstream end of the main and the most suitable is the thermostatic trap made by Spirax, Drayton or other firms, although other cheaper but cruder devices may be used.

There is much more which could be said about steam sterilising but I hope the information given here will lead to a better understanding of the process and enable you to layout your new system or perhaps improve the one you already have.

M. C. Luxmoore comments on . . .

The AIR : BED RATIO with TRAYS

The strictures of Stanley Middlebrook on the Tray System will hearten the old-fashioned shelf grower, and may even encourage a wry smile from a ridge-bed enthusiast.

Mr. Middlebrook is in the happy position of being able to judge both sides of the question from a practical point of view, and this is the acid test. Juggling with figures is one half of the problem, practical application the other.

Yorkshiremen, so I am persuaded, have a particular facility for coining *brass*, and enough proof, from my point of view, is furnished by his preference for shelves. Alive to his methods, I know he would be ruthless in a change-over to trays if it were to his advantage. His buildings are highly efficient, and he is not pressed through constructional (house) difficulties. Yet, of the two systems, he weighs in heavily with the shelf.

Perhaps the most critical factor of any growing area is its ability to provide sufficient fresh air, in the required place, regardless of temperature—an ideal never attained, but nevertheless always to be rigidly kept in view. And let me emphasise " *in the required place* ". This is of paramount importance both to weight and size.

We are in the habit of referring to the " air: bed ratio ", a phrase that slips easily off the tongue, sometimes without the exact meaning we wish to imply. This leads me to my objection to trays.

Mr. Middlebrook reminds us that tray growers sometimes remove the top layer to improve the air: bed ratio. This certainly reduces the area of the crop, and improves the ratio on paper, but the benefit attained can only effect the top layer. **The fresh air is required over and above the whole cropping area.** The ultimate spacing of shelves or trays throughout a given area is the pertinent point.

Yield may rise because the top layer has benefitted from " sufficient fresh air in the required place ", but it is impossible to relieve the situation in the series of trays below. Indeed, it is probable that in any case the top layer was originally best provided, so the advantage is doubtful. And if the tray grower is wise enough to use staging to space out his trays, he must forget at least one argument in favour of reduced capital cost.

Incidentally, the most ingenious method of overcoming this difficulty was devised by a shelf grower; but his brainwave is not mine to impart.

MUSHROOM PEST CONTROL

By **P. G. FENEMORE, B.Sc.** (*Murphy Chemical Co. Ltd.*)

Many new insecticides are being produced and tested every year by various commercial and academic research organisations, but every field of pest control still has some problems which are as yet not completely solved. Mushroom cultivation is no exception to this generalisation.

Of the main mushroom pests, Phorid and Sciarid flies can be satisfactorily controlled by present measures, but control of Cecid flies is not always satisfactory. Springtails can easily be controlled. Some progress is being made in Mite control but there is still no satisfactory answer to Eelworm.

Phorid and Sciarid Flies

No difficulty should be experienced in the control of these pests if DDT or BHC is used regularly and early preventative measures are taken. Smoke, dust or spray forms are all effective.

Cecid Flies

This pest is much more difficult to control than Phorid or Sciarid flies. The life history is similar, but the larvae are almost unique in that they can produce numerous young maggots within themselves without the intervention of the adult sexual form. This phenomenon is known as paedogenesis and makes the pest particularly difficult to

control as large populations of maggots can build up without the occurrence of a susceptible adult fly form.

Thus with this pest, even more than with Phorids and Sciarids, the prevention of adult flies' egg laying is imperative. Again the early and regular use of BHC and DDT is advocated.

With all three types of mushroom flies it is difficult to see how any new chemical can make control measures easier. It is not the difficulty of finding a material toxic to the larvae so much as penetration into the beds. The vulnerable stage in the life cycle of the flies—the adult—can be controlled satisfactorily by present methods.

Springtails

Several species may occur. They can all be controlled satisfactorily by present methods. Spraying with TEPP or dusting with BHC 5% dust are most effective.

Mushroom Mites

Control of mushroom mites with present materials and methods is not always satisfactory. Several different species may occur. Fumigation with Parathion during peak heat is probably the most effective of established measures.

Infestations of mites on cropping beds are more difficult to deal with. Toxaphene as a wet spray is showing considerable promise. Five pints of a 50 per cent. miscible preparation should be used per 100 gallons and up to 1 gallon of dilute wash used per 100 square feet of bed. Toxaphene is non-poisonous and non-tainting and can be safely applied to cropping beds, but application after a heavy picking is advised.

Another new non-poisonous material, PCPBS, gave outstanding results against Red Spider Mite under glass and outdoors during 1952. It has been tried against mushroom mites on a small scale, but so far without success. Many new materials are now being developed for Red Spider control and no doubt some of them will prove effective against mites on mushrooms.

Eelworm

Species of *Ditylenchus* and *Rhabdites* may occur. Here again no definite new control measures can be reported. 8-hydroxyquinoline has been reported as being effective, but this requires confirmation before a definite recommendation can be made. Most important is prevention of infection by attention to general hygiene.

Casing soil is the usual source of infection. This should always be sterilised before use, preferably by steam. Eelworms are killed by a temperature of 130° F. maintained for 2 to 4 hours.

Little can be done once an infestation develops in a cropping bed. Thorough cleaning and sterilising of the houses to prevent infection being carried over to the next crop is most essential.

It might appear from the foregoing that the mushroom grower is not in a very good position as far as pest control is concerned, but this is not really so. More important than cure is prevention. A great deal can be done to reduce pest infestation by proper attention to general hygiene and cleanliness, and this must remain important even with the introduction of new and more efficient insecticides.

FRENCH EXPORTS TO U.S.A.

We are indebted to Ed. Walzer and the New York Journal of Commerce (23.4.53) *for the following report:*

There's money to be made in mushrooms. That goes for the fresh, canned and, to some extent, the dried product, and for imported as well as domestic varieties. A case in point is the experience of the Société Français de Champignonnières.

This group, composed of a number of small independent growers, was organized after World War II by Ernest Durand, a French banker with a keen understanding of American marketing methods. To-day, according to T. G. Koryn, their U.S. representative, SFC is so overwhelmed with orders that deliveries are almost three months behind schedule.

The potential demand, it seems, has hardly been tapped, SFC has been concentrating almost entirely on the institutional trade. Sales are through importers, who solicit private label business. Volume is growing by leaps and bounds, and is straining the capacity of the largest mushroom canning plant in Western Europe. The 1952 gross of $500,000 will be doubled this year, barring unforseen developments.

There are two big reasons for the success of this young organization: (1) The price of a No. 10 can is lower than competing domestic brands, and (2) M. Durand, unlike many European food manufacturers, does things the American way.

*The lower price results from financial arrangements with the French Government which permit the product to be sold here below actual cost.** The American methods include packaging the product in 6- and 24-unit cases.

SFC also offers all customers a private label executed in three colours. More than 60 are now in use.

About 55 per cent. of the company's shipments are in the 16-ounce size; 30 per cent. in 8-ounce cans; and the remainder in No.10 containers.

There are no immediate plans to get into 2-ounce and 4-ounce consumer packs, Mr. Koryn says. " Our price advantage disappears in the smaller sizes ", he explains. " Materials are too expensive in France, and American canning facilities are far too superior.

" Besides we have all we can do to keep up with demand for our present line," he adds.

Mr. Koryn noted, however, that SFC is building another cannery. When it is completed, and the institutional demand is satisfied, the question of going after the consumer trade will be examined again. He estimates that this will be in about one year.

The success of the French firm, while interesting, should be viewed in proper perspective. To be sure, some 1,500 to 3,000 cases are now coming into the country every month, while pre-war shipments only amount to a few hundred cases a year. Compared to domestic production, however, this is a drop in the bucket. Moreover, the canned product only accounts for about 40 per cent. of all mushroom sales in the United States.

**The italics are mine—Editor, MGA Bull.*

Paper given at Peterborough Refresher Course, 16th April, 1953.

Laboratory Examination of Samples

By **Miss D. G. GANDY and P. B. FLEGG**

There are two reasons for examining samples, first to estimate the suitability of compost or casing soil for use, secondly to diagnose the cause of trouble, which can be the result of unsuitable materials, the presence of pests and diseases, or faulty cultivation.

Type of samples which should be sent

1. They should be *representative* especially if the cause of trouble is unknown or if the pH and lime requirements are desired.

2. *Size*—1—2 lb. of soil or compost for pH and lime requirement. Where disease is concerned, the heaviest infection which can be found should be sent.

3. *Packing*. All samples should be clearly labelled with identification of crop or house to which they refer. They should be sent in rigid containers, especially when moulds are sent, as they are very delicate and will not survive drying. Tins with tightly fitting lids are especially suitable. Moulds growing on soil are usually crushed by the soil particles in transit. They are best packed between two glass slides held together with elastic bands. Samples should not be packed in cotton wool as it is impossible to remove successfully.

4. *A covering letter* should be sent separately. When disease or pests are suspected it should give details of the treatment given to the crop and the cleaning procedure adopted. This may be important in detecting the cause of trouble and its possible cure.

5. In case of crop failure, send mushrooms (if any), compost, and casing soil, packed separately.

Suitability for use

(a) *Compost:* The general texture and appearance is noted and the moisture and nitrogen percentage obtained. These properties give some general indication of suitability, but usually it is difficult to rectify any faults once the compost has been made. The pH of a compost can be a cause of trouble or just an indication of other faults. In itself it does not indicate very much and must be considered in conjunction with the other properties and history of the material. Correcting a too high or low pH would not turn a bad compost into a good one.

(b) *Soil:* Optimum pH is 7·5. A low soil pH may be corrected by the addition of lime and for this a laboratory determination of the lime requirement is necessary. The laboratory lime requirement may be lower than that required in practice. It is possible to get more thorough mixing of lime and soil in the laboratory with small quantities than is possible with very large amounts. In giving advice on how much lime to add to a soil, allowance is made for this. This is not very easy, but from our cropping experiments there is little danger in adding excess

lime as long as *carbonate* of lime is used. The main thing is to make sure there is enough. When *hydrated* lime is used there is a danger of the soil pH being raised too high, but it is used by some growers quite successfully and may have a special value against some diseases. Lime containing magnesium e.g. magnesium or dolomitic limestone, should be avoided at all costs.

The soil is also examined for structure or lumpiness and a rough test carried out which gives some indication whether the soil will pan or not when watered. A rough and ready test for water stability is to drop 2 or 3 lumps of the soil ($<1''$ diameter) into a beaker of water and to observe the subsequent behaviour. If the lumps disintegrate immediately, the soil is not very water stable and will pan. The lumps of a water stable soil will still be practically whole after some 5-10 minutes.

Other points which are noted are:—

1. Presence of plant roots, insects, etc. These indicate that the soil is not sterile and that sterilisation may be advisable.

2. The presence of magnesium. If high may be the cause of low yields.

3. Water holding properties. A suitable casing soil should have a high water holding capacity. The water holding properties of doubtful soils can be estimated.

Such observations as these, together, help to show the suitability of a fresh soil for casing, but the only satisfactory test is to try it and when doing so it is best to try it on a small area, say 20—50 sq. ft., before casing a whole house.

Where the soil or compost is already in use, examination of their properties as previously outlined, may indicate whether they are the cause of trouble and whether or not it is possible to rectify the fault. This is not always possible and the best that we can do is to indicate where things have gone wrong and how to avoid the same trouble in future.

Examination of compost for disease

Compost is by far the most frequently received type of sample. For examination it is spread out in white enamel dishes. The light background helps to show up the movement of pests and makes their detection easier. The compost is then carefully examined under a hand lens with a x10 magnification. Any suspicious matter is further examined under the microscope.

The gross appearance of the compost is also noted as it may give important clues. If the compost has been spawned, the condition of the mycelium is noted, whether it has run well or whether it shows sign of being eaten.

A soggy compost with a characteristic unpleasant smell is often the first indication that eelworms are present.

All samples of compost received are tested for eelworms by the Baermann funnel method. A small amount of compost is wrapped in a piece of cheese cloth and is placed in a glass funnel the stem of

which is closed with a piece of rubber tubing and a screw clip. Sufficient water is poured into the funnel to cover the compost and it is left for 24 hours. The water is then run off into a glass dish and is examined with a hand lens and a microscope. Although this method was devised for the extraction of eelworms, it has in practice been found that several other important mushroom pests can also be extracted in the same way. Cecid larvae, mites and mite eggs have been obtained in this manner. It is especially useful when these pests are present in small numbers and there is a danger that they may be overlooked in the first examination.

Cases have occurred where nothing was found in the first examination of the compost but large numbers of mite eggs were washed out. This method is therefore very useful in diagnosing the early stages of attack.

Pests found in compost

Phorid and Sciarid larvae and pupae. These are not often found—due probably to the very effective insecticides now in use.

Cecid larvae—occasional—may be present in large numbers. No cure yet known.

Mites—not often found in large numbers—are not generally the chief cause of trouble.

Eelworms—by far the most commonly encountered pest to-day. Its presence can only be confirmed by laboratory examination.

Fungi

The two commonest fungal diseases found in samples of compost are Vert de Gris and Truffle. Vert de Gris is a term which describes a disease which may be caused by more than one species of yellowish green fungi.

Truffle ascocarps can easily be detected when present in compost. Sections are always cut and examined microscopically to confirm that they are in fact ascocarps and not deformed mushroom pinheads.

Chaetomium species, especially *C. globosum* are also found in compost. There is usually no difficulty in finding the perithecia of this genus if they are present in the sample.

Examination of soil

Where there is reason to suspect that eelworms are present, soil samples are also given the Baermann funnel treatment.

Most soil samples are sent to the Microbiology Department because moulds have been found growing on the casing of the beds and the sender is anxious to know if they are injurious to mushrooms. As previously mentioned, such moulds rarely survive the journey, but they may revive if the soil is kept undisturbed for a few days in a damp atmosphere. The weakness of this procedure is that there is no guarantee that any mould developing under these conditions is the one about which the sender was troubled.

Mushrooms are also received for examination and fall into two categories, diseased or deformed.

Diseased mushrooms should be so packed that the danger of the moulds on them being rubbed off is reduced to a minimum. Mushrooms are frequently received in an advanced state of decomposition. This can be largely avoided if the mushrooms sent away are reasonably young and firm and they are not dispatched at the week-end. The grower is more likely to have the cause of his trouble diagnosed if he sends soil and compost as well as mushrooms, for instance, a dead button may be free of disease and the cause of death not apparent, but examination of the compost on which it grew may reveal the presence of pests which are progressively destroying the mycelium.

Mycogone, *Dactylium* and *Verticillium* are the three chief fungi which attack the mushroom sporophore. Owing to the increasing use of selective fungicides, or because most growers can now recognise them, samples of these diseases are not often received.

Bacterial spot and pit are fairly common and may be an indication of bad cultural practice, but not always.

Deformed mushrooms are frequently received and apart from the naturally occurring first flush deformities, they usually indicate incorrect growing conditions. In such cases the value of a covering letter giving full details of growing procedure becomes apparent. Fumes from creosote, formalin and phenolic disinfectants may also be the cause of deformities and poor crops, so the sterilization procedure should also be stated.

In general, samples received are examined in the ways described and the cause of the trouble is usually ascertained. If there is nothing apparently wrong, there is always the possibility that the physical and chemical properties of the soil or compost are unsuitable for mushroom growing. Even when a disease or pest is found it is not always the main cause of unsatisfactory crops, for example a sample of compost was found to be heavily infected with White Plaster Mould (*Scopulariopsis fimicola*), but this alone was not considered to be responsible for the poor crops obtained. It is, however, known to favour alkaline conditions and the pH was found by the Chemistry Department to be 9—much too high for mushroom growing.

Compost and especially soil are the natural habitats of many organisms and we frequently receive samples of fungi which growers have found in their mushroom beds. No attempt is made to identify them all unless there is reason to suspect that a new disease has been discovered since the identification of such fungi is a laborious process and indeed there are many which have not been described or named. From the point of view of the mushroom grower, it is sufficient to establish whether the fungus is or is not one of those known to be harmful to the crop.

RESEARCH FUND, 1953

The following donations to the Yaxley Research Station received during July are gratefully acknowledged: Mrs. H. Robertson (South Africa) £10 18s. 6d.; D. McCord (Australia) £5; W. S. Galbraith £1 1s.; L. M. Legerton £1; G. E. Read £1. With Bankers' Orders amounting to £10 the 1953 Fund now stands at £958 18s. 3d.

MY WAY OF GROWING

12—John Berry, *Ruislip Common*

Starting from scratch in early 1950, a block of three 36 ft. sheds were constructed from the wooden framework of an old " squatters hut " purchased at a bargain price a few hours before the Ministry of Works were due to start its demolition. Re-erected with double asbestos sheet walls with aluminium foil interlining, these houses served well enough until the air-raid shelter bunks forming the shelves needed replacement. Insulation of the houses suffered with every peak heating and the subsequent increase in disease and decrease in production became apparent at the same time.

Three ten-gallon oil drum coke braziers were used for peak heating, but I felt that there was a limit to the number that could be used to compensate for the poor insulation, owing to lack of oxygen for their burning and the excessive drying out of the compost.

The problems of dropping production and replacement of beds were both successfully overcome by becoming a shelf grower in trays, and if any other grower is without a proper peak-heating house for the normal two-zone tray method, and is finding it difficult to obtain an efficient peak heat for shelves in poorly insulated sheds, then my present temporary procedure may be of interest.

The programme is as before, four turns of light and medium heavy manure over a period of 25 days, usual gypsum added at second turn, 12 lb. dried blood at third turn, and BHC at fourth. The filled trays are stacked in the normal block fashion in the *growing* house and, owing to this tighter packing as compared with the shelf method, only two braziers are required to guarantee a 140° F. peak heat in 24 hours at the most. With the restricted air flow over each tray, drying out is almost negligible, and the subsequent slower cooling down seems to produce a much better growing compost.

One-inch spacers are used between trays after spawning, which is now done by ruffling crumpled spawn or pellet spawn into the surface of the compost with the fingers. The resultant quick covering of the compost with mushroom mycelium is I think responsible for the complete relief from White Plaster Mould which had always been my worst trouble on the farm when on shelves. By careful placing of the trays after spawning, the casing and stacking of the trays for growing can be carried out without taking any of the trays out of the house.

A 30 ft. " foam slag " house was erected last year and, although it is intended as a peak heating house for another block, it is at present being used as all the others, except that it is filled with enough extra trays to fill a converted 65 ft. glasshouse.

Thus, by using the same houses for peak heating, spawning and growing, I am of course growing exactly as for shelves, and without any kind of machinery on the farm can expect some dark looks from the

tray grower of Bucks. and shelf advocate of Yorks. However, results do justify the adaptation of both methods as, apart from a greater production per house per year, a far more consistent supply is maintained, which to me is of great importance for my method of selling.

Owing to the quicker spawn run, casing with local subsoil is done 14 days after spawning, which saves a week per crop on the old method, and the crop is taken in eight weeks instead of 11 or 12.

The net result of the changeover is that production which on shelves had dropped to 4·5 lb. per sq. ft. per year (i.e. average of 1·8 lb., $2\frac{1}{2}$ crops per year) has risen to 5·6 lb. per sq. ft. per year (from an average of 1·6 lb., $3\frac{1}{2}$ crops) plus the additional production from the extra 300 sq. ft. now obtained in each shed. The total costs are definitely down, as with the thinner trays the manure bill is reduced more than sufficiently to cover the extra labour costs, which after all are not very considerable. Filling takes longer but is compensated for by quicker emptying; spawning takes an extra 12 man-hours per crop and casing the same, so 24 hours at 3/6d. (local rates) is the total extra labour costs per crop.

Most of our mushrooms are sold within a 10-mile radius direct to shops, hospitals, restaurants and service camps to which they are delivered daily. Being fortunately situated on the outer fringe of the West London suburbs the sales were not difficult to build up and demand now often exceeds supply. A good " all-the-year-round " price is obtained, all chip baskets returned, and of course no covers or bands are needed. The shops are given closed buttons and cups mixed, which is what they prefer, and the restaurants, etc. take the opens, small buttons and large cups. The local early closing day being Wednesday, no picking is done on Tuesday, but the restaurants, etc. have all been " gently persuaded " to take most of their supplies on Monday and Thursday mornings, by which means our heavier Sunday and Wednesday pickings are satisfactorily sold.

Now that the sales have been built up and organised so that the van is well loaded each day, delivery costs amount to $1\frac{1}{4}$*d.—*$1\frac{1}{2}$*d. per lb., so that with rail costs to markets, costs of chips and covers and agents commission all avoided, the profit per lb. is higher than if all production was sent to market.*

An enormous amount of 'phoning and detail work is of course necessary for this type of selling, but as Mrs. Berry handles this, it does not cause any distraction from farm work. One has to be prepared to help clients occasionally by sending special orders, but their goodwill is easily maintained by the freshness of the produce, provided—and it is a big provision—that supplies are regular. Mrs. Berry approached the sales effort from the housewive's angle, and it is surprising how many housewives wait for our delivery day to their particular shop, or alternatively go to a shop supplied by us. Delivery is restricted to at most two shops in each High Street or shopping centre.

One of her maxims is never to over-sell to a greengrocer; rather does she find it best to keep them short, and the increasing demand is

essentially due to the fresh undamaged produce, and the surprisingly effective advertising secured by the delivery van constantly being seen in the shopping areas.

We find that absolute regularity of supply can only be guaranteed by working to the minimum normal output, not maximum, and by arranging two or three elastic orders where, for a slight consideration of price, arrangements are made to supply up to an agreed amount per week. Of course, some of each first and second flushes have therefore to go to market but, as these are usually our best quality, only top prices are secured.

The actual cost of delivery is perhaps a little lower than mentioned above, for all our spent mushroom compost is treated with Nitro Chalk and sold at 5/- per sack of 80 lb., and delivery of these sacks can usually be worked into the delivery route.

On the return journey with the empty van, fish boxes at prices ranging from 4d. to 8d. are collected from the fishmongers *en route* also.

NEWS FOR AUSTRALIA?

A new culture system for better control of mushroom diseases, largely through " pasteurising " of the beds for disease control, has been developed in U.S.A. by steaming to a carefully developed temperature of about 150 degrees. *Melbourne Leader*, 22.4.53.

Exfoliators (Vermiculite) Ltd., of Friars House, New Bond Street, London, E.C.2. are founder-members of the recently promoted Association of Vermiculite Exfoliators which is concerned primarily with co-ordinating strict specifications. At the same time we are informed that the Palabora mines in South Africa have been brought under unified control to ensure that all deliveries from this important area are of consistent high quality and regular grading.

On the left is a picture taken of the vermiculite stand at the MRA's recent Open Day. Mr. F. Bleazard and Capt. Giles Tweedie appear to be very pleased with the prospect of release from the tyranny of soil as a casing medium.

Fred. C. Atkins meets . . . . . .

Mr. HENRY KNAUST IN ENGLAND

The Knaust Brothers, of New York, inventors of the Tray or Two-Zone System, are legendary figures in the exciting history of mushroom growing.

Mr. Henry Knaust visited England in July; the first news I had was a telephone call from his charming wife to say they were here. I was on the point of leaving for the MGA and MRA quarterly meetings in Worthing, so we arranged to meet there. Middlebrook was in the party, and as an old journalist I could not resist the temptation of getting a photographer along to take a picture for the Bulletin of the Arch-Critic of Trays giving his views on the system in no uncertain terms to the King of Trays (13 million pounds a year!). But, believe it or not, I was *dragged* into the picture and we three were taken as I was on the point of (no, not describing " the one that got away ") emphasising my own theoretical objection to the number of times the trays have to be manhandled. Mr. Knaust appreciated this point, and said they had given much thought to the problem, with the result that his trays were now handled only when filled and emptied.

He had much more of interest to tell us, of course, and as Bulletin Editor I was delighted to hear him say: " We shall be happy to write you an article on our methods and experiences, and shall forward together with some pictures after the holidays."

Two days later Mr. and Mrs. Knaust visited Yaxley and spent two hours with Mr. B. A. Noble, Managing Director of Noble Mushrooms Ltd.

Three MGA members talking about Trays.

MEMO. FOR MIDDLEBROOK!

R. DUTHY writes: You may like to publish a picture of a small mushroom grown on our farm where we utilize the "inconvenient, untidy, cumbersome and ugly" Tray System. Weight 3 lb. Diameter 15 inches.

EINAR LORENTZEN writes from Norsk Champignon, Okern, Oslo, Norway: "Mushroom growing is relatively new in Norway, and it is a sad fact that I lack experience. I would therefore like to obtain a position with an English grower to learn the best ways and means of growing. I would be most thankful if you could put me in touch with a grower willing to take me on as a worker for one year. I am aged 30, and unmarried."

NEW (JULY) MEMBERS

Chitters, Dr. Max, 18 St. Andrew's Avenue, Senderwood Post Office, Orange Grove, Johannesburg, South Africa.
Farmers' & Growers' Industries Ltd., British Railways Goods Yard, West Worthing, Sussex.
French, T. M., RR3 Milton, Ontario, Canada.
Hunt, R. H. J., Rotherlea, Easebourne, Midhurst, Sussex.
Lisher, G. L., Brierley, Grinstead Lane, Lancing, Sussex.
Wick, Robert L., 220 Joliet Street, West Chicago, Illinois, U.S.A.

T. T. LEACH adds his complaint about....

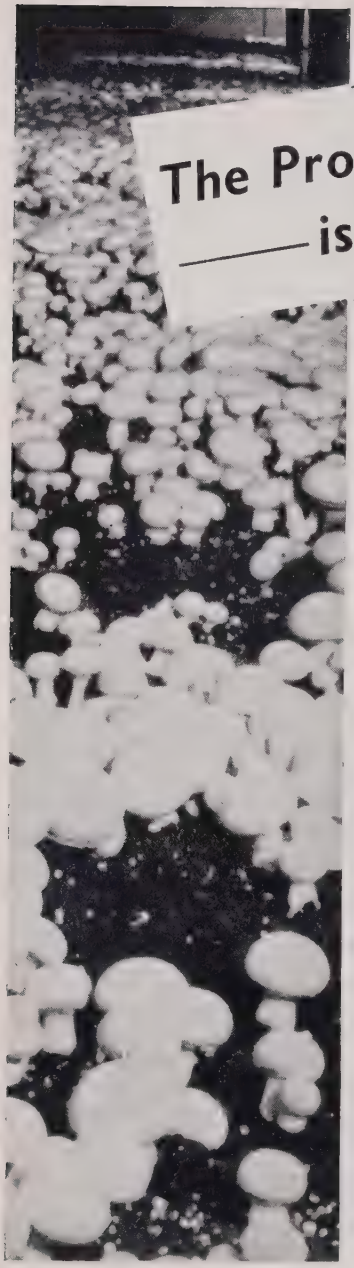
THERMOMETER READINGS

A few weeks before reading Middlebrook's Diary note about inaccurate thermometers I had occasion to compare two of mine side by side in my compost heap. One registered 15 degrees higher than the other!

I then compared five thermometers in warm and hot water with the following results:—

A	65	72	120	122	132	134
B	64	71	125	124	135	138
C	64	70	125	125	136	139
D	63	70	128	128	140	145
E	63	72	129	131	143	not used.

Although in the lower ranges of temperatures there *appear* to be differences of only a few degrees, in the higher they are somewhat staggering and would certainly affect accurate Peak Heating, if nothing else—and that "nothing else" *might* mean lack of, or diseased, mushrooms.



The Proof of the Spawn is in the Cropping

A WELL-KNOWN SOUTH OF ENGLAND GROWER WRITES :—

"Against six other varieties of spawn, growing under the same conditions, and following the same methods of composting, and using the same casing soil, Darlington's 100% Spawn gave from ·4 lb. to ·5 lb. betterment per sq. ft."

DARLINGTON'S

100% PRODUCTIVE MUSHROOM SPAWN

* *Our Advisory Department will be pleased to give information on Mushroom Growing to any Commercial Grower.*

W. DARLINGTON & SONS LTD.

Mushroom Spawn and Insecticide Specialists

WORTHING, SUSSEX *Est. 1860*

Stanley Middlebrook's Diary

July 8. We are learning slowly but surely how unwise it is to go outside a certain temperature range during the spawn run. Too low a temperature—say below 65°—permits moulds to beat the spawn. Too high—as in the case of trays too tightly packed together, precluding heat escape and air movement—and spawn is fermented to a green powder. I would suggest it is worse to be too low than too high *provided* in the latter case the heat can move about. 90° may not be too high if there is air movement.

July 13. Just received a 'phone call: " I'd a lot of good stable manure and thought I'd like to grow a few mushrooms. I composted it and spawned it. I find I've failed; the spawn has run through but mushrooms won't grow. I've had to throw it out and I wonder if you'd buy it. They say you know how to grow mushrooms and it's full of spawn ". Maybe, but I'm no sucker.

July 17. I still can't decide which is the better way of peak-heating—by live steam or by electric tubes. With steam the compost goes too wet; with electricity it goes too dry. The uncertain amounts of compensating air and water that each respectively require render the whole thing just one more item of guesswork.

July 18. I think one of the most difficult problems we have here is the organising of work in such a way that the staff do not go to a " clean " job after they've been doing a " dirty " one. With present low prices and the knowledge that mushroom growing is likely to be increasingly less profitable one must employ the very minimum of labour, and the time has gone when one could be fairly lavish and have one gang for cleaning out a " spent " house and another for turning compost. In our case these two jobs take roughly half a day each, and the compost MUST be done first. Again, if the picking staff also do the trashing, one must be careful to watch that the trashing is done in the " clean " houses before the picking is done in the older, and possibly diseased, houses. This completely disorganises the packing. And so it goes on. Perhaps many growers don't bother about this sort of thing. They're lucky—or are they unlucky?

July 20. Hailstorms, shooting stars, atom bombs and other manifestations from the heavens are as nothing compared with the disintegrating corrugated iron roof of my compost shed. Bang a door, stamp a foot, or even cough, and you are rained on by a shower of shredding sheeting. I often wonder whether the millions of flakes of rusted iron that fall on the compost stacks do harm or good. The roof is now rather like a sieve, the virtue of which is that stacks are watered evenly, if heavily!

July 21. Happy is he who can erect his mushroom farm in an elevated spot. The drains from all our houses flow into a dyke. The drains have a total fall of no more than 12″ to the dyke—a matter of perhaps 150 yards—and the dyke itself has only about the same fall for a quarter

Have you tried the NEW

ECLIPSE

Mushroom Casing Peat

THE MOST SUCCESSFUL CASING MEDIUM YET USED

Because IT IS SPECIFICALLY PREPARED AND GRADED FOR MUSHROOM CASING FROM DEEP LAYER SEDGE DEPOSITS

This ensures retention of Structure and Aeration even when holding maximum moisture

THE MOST SUCCESSFUL AND ECONOMIC MIXES NOW BEING USED BY LEADING GROWERS ARE :

PEAT *plus* CHALK

PEAT *plus* GROUND LIMESTONE

VISIT OUR STAND AT HARROGATE

Further Information from :

THE ECLIPSE PEAT COMPANY LTD.

ASHCOTT, SOMERSET

Tel. No. : Meare Heath 202

of a mile to the parish main drain. This is bad enough if only clear water has to be removed, but we all know how house sweepings, soil, compost, leaves and all sorts of sludge have to flow down as well as water. Our drains are nearly always " bunged up " and it takes a man nearly full-time unbunging them.

July 22. I'll run the risk of being cornered, badgered, beaten, trounced once again—this time at the Harrogate Show –by those aggressive individualists, the spawnmakers. I must tell you that Spawn "A" and Spawn " E " (the one that was going to solve all our troubles) are diametrical opposites. "A" gives a very quick crop of too-small mushrooms while " E " develops much later and takes longer but gives a better quality. I'm thinking of mixing the two thoroughly before planting. I should then get a long crop, starting early and be able to indulge in that happy mushroom pastime known as grading. Observation: It's one thing to mix two spawns but quite another to get two spawnmakers together!

July 27. I hope I'm not maligning my fellow North Countrymen when I say that to us a dirty and crumpled £1 note has the same value as a clean one. It may be that up here we're not so fussy about immaculate, show class mushrooms as the Southerner, and I shall be surprised if the Harrogate Show Competition brings forth as fine a quality from Northerners as we saw in Worthing last year. Maybe I shall never hear the end of this, another possible Middlebrookian *faux pas*, but anyway it's a challenge!

July 28. When my Handcraft Huts were built the only available roof vents were of 6″ diameter and at five to a 40′ house give a total extracting area of under 1 sq. ft. The 12″ diameter vents now available give, with the same number, 4 sq. ft. This difference is very considerable and no doubt those who are using them will be more satisfied with their air movement than I am. But even 4 sq. ft. per 40′ × 18′ compares badly with the 30 sq. ft. that is possible for the same sized house where full-length louvre vents are used. The remarkable thing is that we can get good crops with only 1 sq. ft. of top ventilation. Is more really necessary? I wonder.

Aug. 4. I have repeatedly observed that our small market town fills up with visitors remarkably quickly and completely on Bank Holidays and have always assumed they were sightseers (our Abbey is quite an attraction) but recently the truth emerged. On these occasions our pubs are open all day and the West Riding flocks hither to " take its fill " of this phenomenon. As a student of the effects of such phenomena on the human being I shall be interested to see what happens at the Harrogate Show where the same " all-day " condition is to be imposed. I shall set myself in an elevated " stool and elbow " position to observe the result in close detail.

Aug. 6. One of the moulds I have succeeded in producing, presumably as a result of overheating during spawn run, " appears to be *Aspergillus*," according to the pundits, " probably *A. fumigatus* –which, so far as mushroom growing is concerned, means nothing." It did. Nothing grew!

A **NEW** MURPHY product★
in the control of
RESISTANT FLIES . . .

Introduced this season following extensive trials, MURFUME DITHIO SMOKES have been used with marked success in the control of resistant flies on mushrooms. These smokes contain the new phosphorus insecticide Dithio TEPP, and are recommended for use where other methods have not produced satisfactory kills.

★
MURFUME DITHIO SMOKES

Box of 6 canisters, No. 5, at 6/- each (each canister fumigates 5,000 cu. ft.) **36/-**

Box of 12 canisters, No. 2, at 3/6 each (each canister fumigates 2,000 cu. ft.) **42/-**

THE MURPHY CHEMICAL COMPANY LTD.
WHEATHAMPSTEAD HERTFORDSHIRE

GROW MUSHROOMS UNDER MODERN CONDITIONS!

by installing **WATFORD HANDCRAFT HUTS**

Patented Interlocking Asbestos-Cement Construction

18′ span x 36′ length, which may be varied at will by the addition or subtraction of "Rings," each 3′ 9″ effective coverage. Lining Sheets and Thermal Insulation Materials, Windows, Ventilators and Foundation Blocks are available to suit individual requirements.

Full Particulars from :—

STANDARD RANGE & FOUNDRY CO. LTD.
QUEENS ROAD · WATFORD · HERTS.
Telephone WATFORD **2261** (6 lines) ● *Telegrams* STANDARD, WATFORD

"YOU CAN'T KEEP A GOOD SPAWN DOWN"

PINKERTON'S PROLIFIC

PURE CULTURE SPAWN

SMALL ADVERTISEMENTS (3d. a word)

MUSHROOM TRAYS, cut to your sizes, any shape or design to your drawings, from our sawmills at Harlow. R. C. DARLINGTON, Hastingwood.

HOSES. Haws water cans. Trigger lances complete with rose 35/6d. Special make. R. C. DARLINGTON, Hastingwood.

1-6 ton lots Technical **NITRATE OF POTASH** 99/100% at £67 10s. per ton, delivered 25 miles radius London. Write for analysis. R. C. DARLINGTON, Hastingwood, Harlow, Essex.

PEDIGREE GENUINE WHITE FINISH PAINT, in 5 gallon drums 54/6 per gallon. **PINK PRIMING,** very heavy, 5 gallon drums 51/6d. per gallon. **COOKSON & JOHNSON'S GENUINE ENGLISH WHITE LEAD,** in 5 gallon drums 57/6d. gallon, 100 gallon and over 55/- per gallon. Sample with pleasure, delivered 25 miles radius Hackney Warehouse. R. C. DARLINGTON, Hastingwood, Harlow, Essex. 'Phone: Potter Street 138.

TONKIN CANES. Send for new season's Price List Tonkin Canes 4 ft. 6/8 lbs. to 24/26 lbs. Special price for 50-bale lots *ex* Hackney Warehouse. Also Split Chinese Flower Sticks 24 inch 97/- per 5,000 Bale. Cheapest house in the trade for Sundries. R. C. DARLINGTON, Hastingwood, Harlow, Essex.

ZINC ETHYLENE-BIS-DITHIOCARBAMATE - "386" PRODUCT. In 1 cwt., ½ cwt., 28 lb. Kegs Free. No less than 7 lb. all at 3/9 per lb. Carriage Forward. R. C. DARLINGTON, Hastingwood, Harlow, Essex.

VERMICULITE. 28/- cwt., £26 per ton, *ex* HACKNEY WAREHOUSE. R. C. DARLINGTON, Hastingwood, Harlow.

"386" CASING PEAT, £11 8s. 6d. per ton, £10 5s. 0d. 2 tons, £8 17s. 6d. 4-6 tons lots, *ex* Hackney Warehouse. R. C. DARLINGTON, Hastingwood, Harlow, Essex.

MUSHROOM GROWERS' supplies of all kinds, consult J. E. R. SIMONS LTD., Harlow, Essex. 'Phone Potter Street 65. Telegrams Simons Harlow. Sole distributors of MOUNT MUSHROOM SPAWN.

D.V.M. (15) POWDER. (ZINC ETHYLENE BIS-DITHIOCARBAMATE). THE ORIGINAL MATERIAL AVAILABLE FROM STOCK. 7-lb. bags 5/- per lb.; 14-lb. bags 4/9 per lb.; 28-lb. bags 4/6 lb.; *carriage and packing free.* J. E. R. SIMONS LTD., Harlow, Essex.

GYPSUM direct from Gypsum Mines, 1 cwt. 6/6, 5 cwts. 6/- cwt., 10 cwts. 5/6 cwt., 1 ton 5/- cwt., 2 tons 4/6 cwt., 4 tons 4/- cwt., 6 tons 3/9 cwt. Carriage extra, by road or rail, at cost. J. E. R. SIMONS LTD., Harlow, Essex.

RUBBER BANDS. 1 cwt. 7/9d. lb., 56 lb. 8/- lb., 6 lb. 8/6d. lb., single lb. 9/-. No. 18, 2,300 to lb., No. 32, 1,175 to lb. J. E. R. SIMONS LTD., Harlow, Essex.

SMOKE BOMBS, BHC DUSTS, DDT DUSTS. All best known brands Insecticides and Fungicides available. J. E. R. SIMONS LTD., Harlow, Essex.

PLASTIC HOSE. ½" 6½d. ft., ⅝" 8¼d. ft., ¾" 9½d. ft., 1" 1/3¾d. ft. 60 ft. lengths and multiples. Carriage paid. J. E. R. SIMONS LTD., Harlow, Essex.

TRAYS. New in all designs from 4/-, wired ends. Used fish trays from 2/-. Quotations by road or rail. J. E. R. SIMONS LTD., Harlow, Essex.

TRIGGER LANCES. To fit ½" & ¾" Hoses. Complete with Oval Rose, 37/6d. plus postage. J. E. R. SIMONS LTD., Harlow, Essex.

PEAT. We can supply several types and grades. Send us your enquiry for best carriage paid prices. J. E. R. SIMONS LTD., Harlow, Essex.

SOIL STERILIZING / COMPOST MERCURY THERMOMETER. Improved design, in stout brass case, registering 30/240 F. Fitted 2" Red Plastic Ball for easy location in heap. 17", 27/6 ; 3ft., 48/9. J. E. R. SIMONS LTD., Harlow, Essex.

BARROWS, TRUCKS, ROLLER CONVEYORS. Send your enquiries to J. E. R. SIMONS LTD., Harlow, Essex.

CHIP BASKETS, PACKAGES AND ALL PAPERS, at competitive prices. J. E. R. SIMONS LTD., Harlow, Essex.

PURE DRIED GROUND POULTRY MANURE. This pure, natural organic is regularly used by prominent mushroom growing firms. It represents an invaluable *organic* activator for stable manure. Finely and evenly ground, it is convenient and clean to handle and being packed in ½ cwt. sacks, the weight you receive is *guaranteed*. Sample and prices (which vary according to the distance for carriage from our Works) on application. Sole Producers:—THE HAMPSHIRE GUANO CO. LTD., SOBERTON, SOUTHAMPTON. (Estd. 1937). Manufacturers of "Gunos" (Regd.) Brand Fertilisers.

BOILER, PIPES, Etc., FOR SALE. Ideal H.N.4 Sectional Hotwater Boiler, 11-sections, rated 1,227,000-BTU, for 6,635′ of 4″ Pipe. Gilled Tubing, 50′ of 4″, 200′ of 3″, screwed. Large quantity of 4″ C.I. Hotwater Pipe. Also Tubular Electric Heaters from 4′ to 12′ long. A. H. KIMMINS & SONS LTD., Lyndhurst Road, Worthing.

STABLE MANURE. We can offer regular supplies from depôt in Leicestershire, also our other usual various sources, for delivery direct by Road or Rail, on certified Board of Trade Weighbridge Weight Tickets only. R. G. WARWICK, Wickham, Hants. ('Phone 3150).

INTENSIVE FREEHOLD MUSHROOM FARM FOR SALE BY AUCTION, 23rd SEPTEMBER. Combe Bank Market Gardens, Sundridge, Nr. Sevenoaks, Kent. Fully Equipped Buildings affording 16,620 sq. ft., with subsidiaries; also 3½ acres ripe building land. Two Freehold Residences are for sale by Private Treaty in addition. Particulars PATTULLO & VINSON, Land Agents, Sevenoaks, Kent. 'Phone 2329 & 2320.

HARROGATE CONFERENCE. Combine business with pleasure at the HOTEL MAJESTIC, Harrogate. Every comfort and service at reasonable charges. Details from the Manager.

The Chairman and Executive Committee
of the
Mushroom Growers' Association of Great Britain and Northern Ireland extend to you a cordial invitation to the Second MUSHROOM INDUSTRY EXHIBITION, to be held at the Royal Hall, Harrogate, from 10 a.m. to 10 p.m. on Wednesday, 30th September, 1953.

The Annual MUSHROOM LUNCH (tickets 15/- each) will be followed by the ANNUAL MEETING of the MGA, both at the Hotel Majestic, Harrogate, on Tuesday, 29th September, 1953.

● COMPOST FOR MUSHROOMS

WHEAT STRAW when treated with ADCO "M" will readily provide a substitute for horse manure for growing mushrooms

ADCO "M"

IMPROVES MANURE SUPPLIES

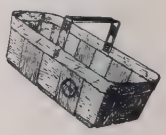
● LONG STRAW MANURE

Manure for mushroom culture such as that from racing stables is frequently in too long and dry a condition. This can be considerably improved by using ADCO "M" with better crops as a result.

Particulars & Prices from **ADCO LTD.** HARPENDEN, HERTS

for Quality and Service

ATLAS CHIPS



THERE IS NO BETTER PACKAGE FOR YOUR MUSHROOMS

We are exhibiting at Harrogate on the 30th September, 1953, and look forward to seeing you there

THE ATLAS BASKET COMPANY LIMITED

HARPENDEN HERTS.

Telephone : Harpenden **3121** Telegrams : "Atlas, Harpenden"

PERFECT MANURE TURNING

100% AERATION 100% TEASING

No. 6

DLP COMPOSTER

PATENT No. 627955 ETC.

ATTACHMENT FOR AUTOMATIC WATER SPRINKLING

— IN USE ALL OVER BRITISH ISLES AND ON CONTINENT —

ALSO SOIL BREAKERS AND SPECIAL MACHINERY
DESIGNED & MADE FOR NOBLE MUSHROOMS LTD., OF YAXLEY

INQUIRIES TO:

HARRY F. ATKINS (Machine Tools) Ltd.

YAXLEY SIDINGS, PETERBOROUGH

Grams: "ATKINS, YAXLEY" Tel.: Yaxley 441

You are Invited....

• TO SEND YOUR MARKETABLE PRODUCE

TO—

J. C. LUCAS & SONS LTD.

Fruit & Flower Salesmen

CASTLEFOLDS MARKET, SHEFFIELD

• **For the Best Prices and a Straight Deal**

OUR SPECIALITIES ARE MUSHROOMS

HOUSE GROWN EARLY VEGETABLES, SOFT & SPECIAL FRUITS AND FLOWERS

ESTABLISHED 1888

Telephone 22618 • Flowers 25590

PERSONAL ATTENTION TO ALL SALES

Do you prepare your compost blindfold?

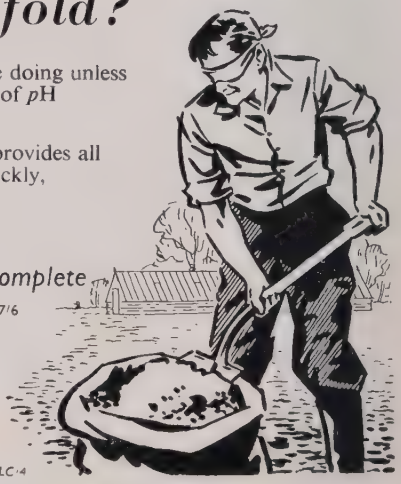
That is, in effect, what you are doing unless you employ a reliable method of *p*H measurement.

A B.D.H. Soil Testing Outfit provides all you need to make *p*H tests quickly, easily and accurately.

B.D.H. Barium Sulphate Soil Testing Outfit *55/- complete*

Also: B.D.H. No. 1 Soil Testing Outfit 7/6

Obtainable from all chemists



Write for descriptive literature.

THE BRITISH DRUG HOUSES LTD.
B.D.H. LABORATORY CHEMICALS GROUP
POOLE **DORSET**

STO/LC/4

Mushrooms galore in **KING**
precast concrete MUSHROOM HOUSES

HIGH INSULATION

The insulation value of the 4 inch thick Foamed Slag Block wall (unrendered) is higher than that of an 11 inch cavity brick wall rendered and properly ventilated.

LOW COST

The strong concrete frame makes a load-bearing wall unnecessary; the 4 inch Foamed Slag Block wall keeps heat in and costs down.

EASY ERECTION

This has been a major aim, and it has been achieved. A local builder can do the job with no trouble at all.

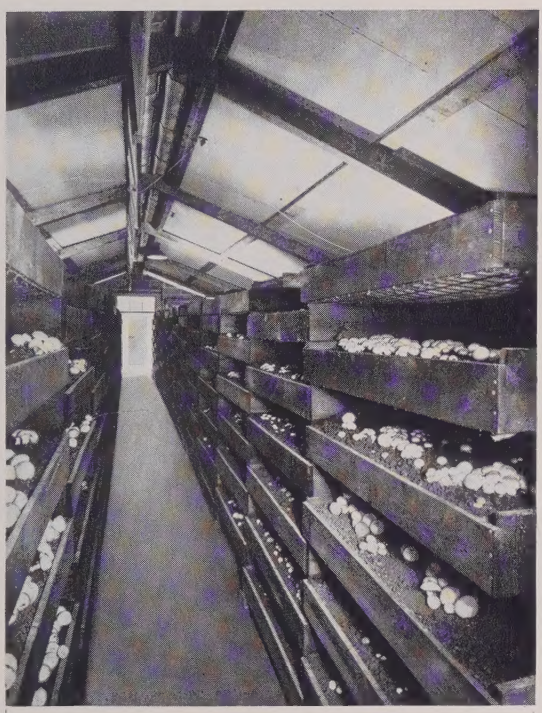
WIDTH: 18 ft.

LENGTH: In multiples of 10 ft.

HEIGHT: 6 ft. 6 ins. to 8 ft. at eaves.

BENCH OR TRAY: The houses are equally suitable for either system.

CAPACITY: An 18 ft. by 60 ft. house will hold over 500 (4 ft. by 2 ft.) trays.



Inside a typical KING Prefabricated Mushroom House, one of a number designed, manufactured and erected by Geo. W. King Ltd. for Dr. A. R. Rooke, Alton, Hants.

Write for fuller details to W. DARLINGTON & SONS LTD.
WORTHING, SUSSEX, *Sole Agents for* KING *Mushroom Houses in the British Isles*

KING

PRECAST CONCRETE MUSHROOM HOUSES

REGISTERED TRADE MARK

"GROWERS"
FUMIGATING IS MY BUSINESS TOO

40 YEARS of experience in this particular trade has taught me that there is nothing to compare with Nicotine Fumigation to get the best results. Imitations and experiments have proved nothing to better it. With complete confidence I assure you for dependability Nicotine Fumigation is still **TOPS** as it was 60 years ago.

This Yellow Tin is Famous

For ITS KILLING POWERS —→
For PREVENTING RISK of TAINTING —→
For ITS STRENGTH IN NICOTINE —→
For MONEY BACK GUARANTEE —→
For ITS LASTING SMOKE VOLUMES —→

These Shreds contain 20% Nicotine, will kill the Adult Spider, Green Fly, White Fly and their eggs, leaves no trace of insect life, yet so safe to use a boy can use it.

R. C. DARLINGTON'S
TOBACCO FUMIGATING SHREDS

(Full Strength Nicotine)
Packed in Air-tight Tin Containers
specially for Nurserymen

2 lb. tins 40,000 ft. **14/6** 1 lb. tins 20,000 ft. **7/6**

Insist on this Signature

Known Origin and Proven Performance

THREE EIGHT SIX
386
PRODUCTS

Sold everywhere by QUALITY SEEDSMEN *or direct from*

R. C. DARLINGTON
(Chemical Processing)
HASTINGWOOD . HARLOW · ESSEX

The CULVERWELL *Manure Turner*

FOR MUSHROOM GROWERS

•

PETROL *or* ELECTRIC

•

EXTREMELY MOBILE

•

£225
Ex Works

The small machine with the BIG turnover

Bruises and aerates–does not shred. CAN BE USED FOR ALL TURNINGS. 3 men handle 25/50 tons per day. Waters as it turns. Stacks up to 5 feet. By using the CULVERWELL MANURE TURNER throughout the whole composting process, the work is reduced to the minimum, time taken is shorter with improved results.

Will pass through a door 2′ 10″ x 5′ 10″ with the detachable wheels removed

E.O. CULVERWELL *Ltd.*

MALLING WORKS LEWES · SUSSEX

Telephone LEWES 637*
(5 LINES)

We shall be pleased to see you

AT OUR STAND

Mushroom Industry Exhibition

ROYAL HALL, HARROGATE

30th SEPTEMBER, 1953

* * * *

J. E. R. SIMONS LTD. · HARLOW · ESSEX

This Society was started by Farmers to help Farmers and Growers and offers Farmers and Growers the finest insurance policies at the lowest possible premiums.

NATIONAL FARMERS UNION MUTUAL INSURANCE SOCIETY LTD.

Head Office: Stratford-on-Avon

General Manager: G. C. D. Lindsay, F.C.I.I.

• *Assets exceed £9,000,000*

MUSHROOM LITERATURE

★

New members may like to know that many back numbers of the MGA BULLETIN are still in print and may be purchased from the MGA Secretary

Tie 71

Published by the Mushroom Growers' Association, Yaxley, Peterborough, England and printed by W. S. Maney & Son Ltd., Russell Street, Leeds 1